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PATENT SPECIFICATION

(11) 1250 535

NO DRAWINGS

- (21) Application No. 11323/69 (22) Filed 3 March 1969
 (31) Convention Application No. 16550 (32) Filed 4 Dec. 1968 in
 (33) Sweden (SW)
 (45) Complete Specification published 20 Oct. 1971
 (51) International Classification A231 1/02
 (52) Index at acceptance C6E 5 6D



(54) FRUIT BEVERAGE

(71) We, ASTRA-WALLCO AB, a Swedish Body Corporate of Upplagsvagen 10, 126 12 Stockholm 42, Sweden, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to a dry powder composition for juice preparation, and to beverages prepared from the powder.

Dry powder compositions with fruit flavour for dissolving in water are previously known but show, however, the disadvantages that they, in admixture with water do not give a lasting flavour in the mouth but only a temporary one which is fairly rapidly followed by a watery taste. The fullness of flavour combined with lasting flavour in such a beverage is consequently not experienced, owing to the fact that the acids incorporated in the beverage, are rapidly neutralised by the saliva and thus a lasting decrease in the pH around the gustatory nerves is not obtained.

Therefore, viscosity increasing substances such as carboxymethylcellulose (CMC) have previously been added in order to increase the fullness of flavour of the beverage in the mouth.

The present invention provides a dry powder composition, which gives when dissolved in an aqueous medium, such as water itself, a flavour of the same intensity and the same duration as that of the corresponding natural fruit juice.

It has now most unexpectedly been found possible to prepare a dry powder composition, which gives the same fullness of flavour as a natural fruit juice without the addition of viscosity increasing substances.

The invention therefore provides a dry powder for preparing juices having fruit flavour when dissolved in an aqueous medium, the fruit flavour having substantially the same intensity and duration as the flavour of the corresponding natural fruit juice, the powder containing no viscosity increasing substances and comprising at least one flavouring agent, colouring agent and sweetening agent and a buffering system comprising at least one polycarboxylic acid and at least one alkali metal or calcium salt of a polycarboxylic acid, the buffering system being such that (a) the molar ratio of the acid to the salt is 1.9:1 to 5.5:1, (b) when the powder is dissolved in a predetermined volume of the aqueous medium for consumption the acid content is 0.013—0.034 moles/litre and the salt content is 0.0046—0.0116 moles/litre and (c) when the solution of the powder in the aqueous medium is consumed, it produces a decrease in pH around the gustatory nerves to a pH of 2.5—4.5, preferably 3.0—4.0 and particularly 3.1—3.8, the buffer capacity of the system being such that the duration of the decrease in pH is substantially the same as that produced by the corresponding natural fruit juice.

The tests of the beverages on the gustatory nerves are preferably performed by a panel of people rather than a single person.

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The sweetening agent is preferably sugar, and/or saccharin provided for intensifying the flavour. It is also possible to use a cyclamate.

- 5 The acid is preferably citric, maleic, fumaric, tartaric, succinic or adipic acid. The alkali metal is suitably sodium and/or potassium.

- 10 The amount of acid added is preferably 0.015 to 0.031, moles/l. of prepared beverage, while the amount of salt is preferably 0.0058 to 0.0105, moles/l. In the acid mixture, ascorbic acid may suitably be included as well.

- 15 The invention also provides a beverage having fruit flavour comprising an aqueous solution of the above dry powder.

The beverage is suitably prepared by dissolving the powder in water.

- 20 Part of the acid and/or salt in the powder can if desired be replaced by an alkali metal carbonate in order to provide carbonated beverages.

The invention is illustrated by the following Examples.

Example 1

- 25 Anhydrous citric acid (5.6 g.), anhydrous trisodium citrate (2.1 g.), ascorbic acid (0.225 g.), sodium cyclamate (0.72 g.), sodium saccharin (0.08 g.), and calcium phosphate (0.1 g.) together with food colours and orange
30 aroma are mixed in powder form and the dry powder mixture is packed in packages of a water vapour tight material. The powder

should be dissolved in 1 litre of water. The 0.72 g sodium cyclamate may be replaced by 0.07 g sodium saccharin, so that a total of 0.15 g sodium saccharin is used.

Example 2

Anhydrous citric acid (6.0 g.), anhydrous trisodium citrate (1.5 g.), sugar (80.0 g.), ascorbic acid (0.225 g.) and calcium phosphate (0.1 g.) as well as food colours and lemon
40 aroma were mixed and packed, according to Example 1, to give sufficient powder to be dissolved in 1 litre of water.

Example 3

A mixture of anhydrous citric acid (6.0 g.), anhydrous sodium citrate (1.5 g.), sodium saccharin (0.15 g.), ascorbic acid (0.225 g.) and calcium phosphate (0.1 g.), as well as food
45 colours and lemon aroma, give sufficient powder for 1 litre of water.

Example 4

Anhydrous citric acid (3.0 g.), anhydrous maleic acid (0.9 g.), anhydrous sodium citrate (2.7 g.), sodium saccharin (0.07 g.) and sodium cyclamate (0.63 g.), as well as food colours
55 and strawberry aroma, when mixed gave enough powder to give 1 litre of beverage. The following Table shows the weight (g./l.) of the different compounds included in the beverages
60 of the various flavours.

TABLE

	Orange	Lemon	Strawberry	Raspberry	Apple
Sodium citrate	2.1	1.5	2.7	1.75	1.75
Citric acid	6.0	6.0	3.9	3.0	3.0
Sodium saccharin	0.08	0.075	0.07	0.09	0.08
Sodium cyclamate	0.72	0.675	0.63	0.81	0.72
pH	3.3	3.1	3.8	3.7	3.3

- 65 In this Example, the 0.63 g/l of sodium cyclamate used in the Strawberry drink may be replaced by 30 g sugar and the amounts of sodium cyclamate used in the other drinks replaced by a *pro rata* amount of sugar.

- 70 The amounts of sodium saccharin, and sodium cyclamate, if used, are so chosen that they correspond to the natural juice in sweetness.

- 75 The citric acid and trisodium citrate in the above formulations may be replaced completely or partly by any non-toxic polycarboxylic acids having suitable pK_a -values and their salts, respectively; the trisodium citrate may be substituted by other sodium citrate, i.e. di- and mono-sodium citrate

Further, the sodium ion may to some extent be replaced by potassium ions, or completely or partly by calcium ions if the solubility of the salts of the respective acids makes this possible.

85 In the Examples only citric acid and a mixture of citric and maleic acid has been used as the main components of the acid mixture. Examples of other suitable acids are fumaric, tartaric, succinic and adipic acid. The acids should however, always have such pK_a -values that a buffering system is obtained in the pH
90 range of 2.5—4.5.

It is also possible to use one polycarboxylic organic acid having one suitable pK_a -value and combine such a polycarboxylic acid with

- a monocarboxylic organic acid having another suitable pK_a -value in order to form an acid mixture having suitable pK_a -values. Thus for example a polycarboxylic organic acid may be mixed with gluconic acid, which is monocarboxylic, to form an acid mixture having suitable pK_a -values.
- By means of the buffering system provided by the acid mixture, a buffering capacity is obtained which corresponds to the buffering capacity of natural fruit juice being normally sour. Thereby a lasting decrease in the pH around the gustatory sensors is obtained, which has the same duration as the decrease in pH obtained by natural fruit juice, and thereby the fullness of flavour of the natural fruit juice in the mouth is attained.
- The expression "fruit" as used in this specification is intended to include fruits and berries, such as orange, lime, lemon and apple and strawberry, raspberry, blueberry and gooseberry, respectively.
- We are aware of The Soft Drinks (Amendment) Regulations 1969 and make no claim to the use of the present invention contrary to law. Subject to the foregoing disclaimer:—
- WHAT WE CLAIM IS:—
1. A dry powder for preparing juices having fruit flavour when dissolved in an aqueous medium, the fruit flavour having substantially the same intensity and duration as the flavour of the corresponding natural fruit juice, the powder containing no viscosity increasing substances and comprising at least one flavouring agent, colouring agent and sweetening agent and a buffering system comprising at least one polycarboxylic acid and at least one alkali metal or calcium salt of a polycarboxylic acid, the buffering system being such that (a) the molar ratio of the acid to the salt is 1.9:1 to 5.5:1, (b) when the powder is dissolved in a predetermined volume of the aqueous medium for consumption, the acid content is 0.013—0.034 moles/litre and the salt content is 0.0046—0.0116 moles/litre and (c) when the solution of the powder in the aqueous medium is consumed, it produces a decrease in pH around the gustatory nerves to a pH of 2.5—4.5, the buffer capacity of the system being such that the duration of the decrease in pH is substantially the same as that produced by the corresponding natural fruit juice.
 2. A powder according to claim 1 wherein the pH is reduced to 3.0 to 4.0.
 3. A powder according to claim 2 wherein the pH is reduced to 3.1 to 3.8.
 4. A powder according to any one of the preceding claims wherein the polycarboxylic acid and the polycarboxylic acid of the salt are the same acid.
 5. A powder according to any one of the preceding claims wherein the acid is citric, maleic, tartaric, fumaric, adipic or succinic acid.
 6. A powder according to any one of the preceding claims wherein the alkali metal is sodium or potassium.
 7. A powder according to claim 1 substantially as described in any one of the Examples.
 8. A beverage having fruit flavour comprising an aqueous solution of a powder according to any one of the preceding claims.
 9. A beverage according to claim 8 containing 0.015 to 0.031 mole/litre of the acid.
 10. A beverage according to claim 8 or 9 containing 0.0058 to 0.0105 mole/litre of the salt.
 11. A beverage according to claim 8 substantially as described in any one of the Examples.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1973.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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